

## REMARKS

The present response is intended to be fully responsive to all points raised by the Examiner in the Office Action and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

The application as examined includes claims 27 – 38, 40 – 51, and 71 – 78. In the present response, no claims are amended, no additional claims are canceled, and no new claims are added.

Claims 27 – 38 and 40 – 51 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Genesys-MP: User's Guide* ("Genie") in view of "A Simulation Based Approach to Architectural Verification of Multiprocessor Systems" ("Saha").

The present invention provides a computer program product for validating a multi-processor design by simulating program execution for a test program having at least two simulated processes which access mutually-dependent non-adjacent resources, and by creating one or more tagged value-lists incorporating a set of non-unique values associated with a combination identifier identifying a particular outcome of the test program. The contents of the resources are then compared with the non-unique values in the tagged value-lists to validate the processor design for the test program.

Genie describes the use and operation of the "Genesys" multi-processor test system.

Saha describes verifying coherency in weakly ordered shared memory multiprocessor systems through the use of "data coloring".

The Applicant respectfully traverses the §103(a) rejection of claims 27 – 38 and 40 – 51 on the following grounds:

Saha cannot be combined with Genie, under MPEP 2145 X.D.2., because the reference teaches away from the combination; and

Genie and Saha fail to disclose or reasonably suggest all the limitations of independent claims 27, 42, and 49.

The above points are discussed in detail below:

***Saha cannot be combined with Genie***

The §103(a) rejection of claims 27 – 38 and 40 – 51 relies on Genie section 2.11 to teach associating a set of ***non-unique values*** for said resource. (Office Action page 3, paragraph c.)

However, Genie section 2.11 relates to the “***non-unique results mode***” (Genie page 21), whereas Saha relates to “data coloring”, which Saha characterizes as ***unique data***. Saha clearly indicates that the data is unique, *inter alia* in:

[Saha, 2. Architecture Verification of Memory Coherency, page 35, column 2, third paragraph] “...The dynamic transaction and coherence protocol monitoring is avoided by introducing the concept of valid sets and the use of ***uniquely colored data*** for stores. ...” (emphasis added)

[Saha, 2.2. Data Coloring and Valid Sets, page 36, column 1] “The data-coloring approach to architectural verification of memory coherency is based on two fundamental concepts; ***Data is unique for each store***. If all the different stores write differently colored data, then a read back of a certain data value can be used to unambiguously determine the completions of a store in the memory hierarchy.” (emphasis added)

*Unique data* and *non-unique data* are mutually exclusive. Therefore, ***Saha*** (unique data) ***teaches away from the combination with Genie*** (non-unique data). According to MPEP 2145 X.D.2., “It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F. 2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).”

Saha also renders Genie unsatisfactory for its intended purpose, and thus combining Saha with Genie does not comply with the requirements of MPEP 2143.01 V and MPEP 2145 III.

*Genie and Saha fail to meet the independent claims*

The Applicant respectfully submits that the cited prior art references of Genie and Saha fail to show or suggest at least the following features recited in amended independent claims 27, 42, and 49:

associating a set of non-unique values for said resource; and

replacing said set of value-lists by said set of tagged value-lists, such that said set of tagged value-lists is used in place of said set of value-lists.

The Office Action states that:

“Saha teaches ... replacing said set of value-lists by said set of tagged value-lists (**section 2.2 3<sup>rd</sup> paragraph: updating rules**)”  
(Office Action page 4, lines 5 – 6)

The Applicant respectfully disagrees with the above statement, in that Saha fails to disclose tagged value-lists associated with non-unique data, and also fails to disclose replacing value-lists by tagged value-lists.

As noted above, Saha does not recognize non-unique data. Saha’s data coloring is necessarily restricted to unique data.

In addition, Saha teaches only removing individual values and setting individual values, not replacing value-lists (or sets of values). Moreover, Saha’s removal and setting is conditional on the time of issue of the values, in contrast to the unconditional replacement of value-lists by tagged value-lists of the present invention. The cited passage of Saha reads (page 36, columns 1 – 2, emphasis added):

“The update rule is as follows:

“Case 1. Loaded data is equal to the value associated with a store instruction from the same processor.

“a) *Remove* all values associated with stores from the same processor issued at time  $t < t_i$ ; *Set* “old value” equal to the loaded value.

“Case 2. Loaded data is equal to the value associated with a store instruction from a different processor, issued at time k.

“a) *Remove* all values associated with stores from "that" processor issued at time  $t' < k$ ; *Set* "old value" equal to the loaded value.

“b) *Remove* all values associated with stores from the same processor issued at time  $t' < t$ .”

The Applicant maintains that *removing* and *setting* individual values is not structurally equivalent to *replacing* value-lists with tagged value-lists.

Based on the above, the cited prior art references of Genie and Saha fail to sustain a *prima facie* case of obviousness under §103(a). The Applicant therefore respectfully submits that independent claims 27, 42, and 49 are patentable over the art of record. The remainder of the claims each depend directly or ultimately from the independent claims, and therefore are also allowable over the art of record.

In view of the foregoing remarks, all of the claims are believed to be in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Please charge any fees associated with this response to Deposit Account 09-0468.

Respectfully submitted,

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